# UNITED STATES PATENT AND TRADEMARK OFFICE

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/939,134 | 08/24/2001 | Charles K. Sestok IV | TI-32545 | 2975 |

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| EXAMINER |
|---|
| FILE, ERIN M |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2634 | |

DATE MAILED: 11/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

| | Application No. | Applicant(s) |
|---|---|---|
| **Office Action Summary** | 09/939,134 | SESTOK ET AL. |
| | Examiner | Art Unit | |
| | Erin M. File | 2634 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on _24 August 2001_.

2a)☐ This action is **FINAL**.  2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
   closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) _1-16_ is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-4, 6 and 13-16_ is/are rejected.

7)☒ Claim(s) _5 and 7-12_ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☐ All  b)☐ Some *  c)☐ None of:

   1.☐ Certified copies of the priority documents have been received.

   2.☐ Certified copies of the priority documents have been received in Application No. _____.

   3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
      application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
   Paper No(s)/Mail Date _10/19/2001_.

4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## *Claim Rejections - 35 USC § 103*

1.      The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

2.      Claims 1, 2, 3, 4, 6, 13, 14, 15 and 16 are rejected under U.S.C. 103(a) as being

unpatentable over Mukherjee in view of Fertner.

**Claim 1**, Mukherjee discloses a digital transceiver (fig 2) comprising:

- analog circuitry coupled to a communications facility, for transmitting and

  receiving analog signals in the time-domain over a transmission channel (26R)

- a coder (20R) / decoder (40R) coupled to said analog circuitry

- a time-domain equalizer process, including a conventional finite impulse

  response (FIR) filter

- a Fast Fourier Transform to recover the symbols from the subchannels (33R)

- a frequency domain equalizer to the output of the Fourier transform to remove

  frequency response corresponding to the response of the transmission channel

  from the signal (35R)

Mukherjee does not disclose the coefficients derived according to a mean-squared error

minimization constrained according to a spectral flatness, however Fertner discloses the

coefficients of the digital filter of the time-domain equalizer (fig 3, 53) are selected by

minimizing negative effects of interference with a mean squared error (MSE) term (col

5, lines 58-62). It would be obvious to one of ordinary skill in the art at the time of

invention to incorporate the use of mean squared error as disclosed by Fertner for

choosing coefficients in Mukherjee's apparatus because the MSE algorithm is an

efficient algorithm for finding the average value of an error signal.

**Claim 2** inherits the limitations of Claim 1, further Mukherjee discloses a conventional

finite impulse response (FIR) filter that is implemented by way of a software routine

performed by a digital signal processor (DSP) (col 8, line 33).

**Claim 3,** inherits limitations of Claim 1. In his transceiver Mukherjee further discloses a

process which adds a circular prefix to the bitstream (24R) and also a process (32R) to

eliminate the circular prefixes to interframe portions of the data sequence before the

data enters the Fourier Transform (33R).

**Claim 4,** inherits all of the limitations of Claim 1. Further Mukjerhee teaches an analog

front end (AFE 12) which includes filters (column 11, lines 36, 37).

**Claim 6,** Fertner discloses a training mode in which equalizer filter coefficients

processor (fig 3, 53) calculates optimal timing equalizer coefficient vectors. Coefficients

are chosen to minimize negative effects of interference from adjacent symbols based on

minimizing the mean-squared error.   The use of the mean square error minimization is

discussed in the above paragraph.  The use of a training mode is well known in the art

because it allows an equalizer to quickly calculate coefficients that will best compensate

for noise and interference.  These common techniques would make it obvious at the

time of invention to one of ordinary skill in the art to incorporate Fertner's training mode

into Mukjerhee's apparatus.

**Claim 13**,  Mukherjee discloses a digital transceiver for processing a discrete multitone

time-domain datastream representative of modulating digital symbols in a plurality of

frequency subchannels (column 7 lines 2, 3)  with the following sequence of operations:

- applying a time-domain equalizer to the datastream, the time-domain equalizer
  (52) corresponding to a filter (53) having coefficients of the digital filter of the
  time-domain equalizer are selected by minimizing negative effects of interference
  with a mean squared error term.

- Mukherjee discloses a Fast Fourier Transform (33R)

- a frequency domain equalizer after the Fourier transform operation to remove
  frequency response corresponding to the response of the transmission channel
  from the signal (35R)

**Claim 14** inherits the limitations of Claim 13.

Mukherjee further discloses a process in his transceiver which adds a circular prefix to the bitstream (24R) and also a process (32R) to eliminate the circular prefixes to interframe portions of the data sequence before the data enters the Fourier Transform.

**Claim 15**, inherits the limitations of Claim 13. Further Fertner discloses a training mode in which equalizer filter coefficients processor (53) calculates optimal timing equalizer coefficient vectors. Coefficients are chosen to minimize negative effects of interference from adjacent symbols based on minimizing the mean-squared error as explained in Claim 1.

**Claim 16**, inherits the limitations of Claim 13, further Mukherjee discloses a conventional finite impulse response (FIR) filter that is implemented by way of a software routine performed by a digital signal processor (DSP) (col 8, lines 30-34).

### Claim Objections

3.      **Claim 5** is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

4.    **Claims 7-12** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5.    Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erin M. File whose telephone number is (571)272-6040. The examiner can normally be reached on M-F 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571)272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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